

Appln No. 09/433,730

Amdt date October 30, 2003

Reply to Office action of July 30, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-9. (Canceled)

10. (Currently Amended) A digital communication system comprising:

a front end receiving an input spectrum at an intermediate frequency, the input spectrum including an inserted predetermined frequency component, the front end having a signal path comprising in the order recited a first signal mixer, a signal sampler, a second signal mixer, and an equalizer [~~the first signal mixer lying in the first loop, the second signal mixer lying in the second loop, and the signal sampler lying in the third loop~~];

first and second [~~nested~~] tracking loops, the first loop acquiring carrier frequency lock in operative response to the predetermined frequency component of the received spectrum, the second loop providing a signal adapted to position the spectrum at a predetermined location relative to baseband in operative response to said predetermined frequency component; [~~and~~]

a third tracking loop coupled to define a symbol timing parameter in operative response to said predetermined frequency component[~~[[,]]~~]; and

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the first signal mixer lying in the first tracking loop,
the second signal mixer lying in the second tracking loop, and
the signal sampler lying in the third tracking loop.

11-104. (Canceled)

N.E. 105. (Previously Presented) The communication system of claim 10, in which the front end has a signal path comprising in the order recited a first signal mixer, a signal sampler, a second signal mixer, and an equalizer, the first signal mixer lying in the first loop, the second signal mixer lying in the second loop, and the signal sampler lying in the third loop.

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Cont 106. (Currently Amended) The communication system of claim 10, in which the first and second tracking loops each have a controllable oscillator and a single phase detector for adjusting both oscillators responsive to the output of the [~~second~~] first mixer.

107. (Previously Presented) The communication system of claim 106, in which the first loop has a wide bandwidth to acquire carrier frequency lock and the second loop has a narrow bandwidth to track carrier frequency after carrier frequency lock.

108. (Currently Amended) The communication system of claim 107, in which oscillator of the first tracking loop is coupled to the [~~first~~] second mixer.

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109. (Currently Amended) The communication system of claim 108, in which oscillator of the second tracking loop is coupled to the [~~second~~] first mixer.

110. (Previously Presented) The communication system of claim 10, in which the first loop has a wide bandwidth to acquire carrier frequency lock and the second loop has a narrow bandwidth to track carrier frequency after carrier frequency lock.

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Cont
111. (Currently Amended) A digital communication system comprising:

a front end receiving an input spectrum at an intermediate frequency, the input spectrum including an inserted pilot signal;

a [~~first and second nested tracking loops, the~~] first tracking loop for acquiring carrier frequency lock in operative response to the pilot signal of the received spectrum; [~~the~~]

a second tracking loop providing a signal adapted to position the spectrum at a predetermined location relative to baseband in operative response to said pilot signal; and

a third tracking loop coupled to define a symbol timing parameter in operative response to said pilot signal.

112. (New) The communication system of claim 111, in which the symbol timing parameter is a sampling signal and the third tracking loop has an oscillator that generates the sampling

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signal and means for controlling the frequency of the sampling signal so it is a multiple of the pilot signal.

113. (New). The communication system of claim 112, in which the multiple is four.

114. (New) The communication system of claim 111, in which the first and second tracking loops each have a controllable oscillator and a single phase detector for adjusting both oscillators responsive to the output of the second mixer.

115. (New) The communication system of claim 111, in which the first tracking loop has a wide bandwidth to acquire carrier frequency lock and the second tracking loop has a narrow bandwidth to track carrier frequency after carrier frequency lock.

116. (New) The communication system of claim 111, in which the first tracking loop has a wide bandwidth correction factor to acquire carrier frequency lock and the second tracking loop has a narrow bandwidth correction factor to track carrier frequency after carrier frequency lock, the correction factor from the first tracking loop being leaked to the second tracking loop.

117. (New) The communication system of claim 111, additionally comprising a slicer connected to the front end outside the tracking loops.

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118. (New) The communication system of claim 111, additionally comprising an equalizer connected to the front end outside the tracking loops.

119. (New) The communication system of claim 118, additionally comprising a slicer connected to the equalizer outside the tracking loops.